

## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : SHIMADZU CORP

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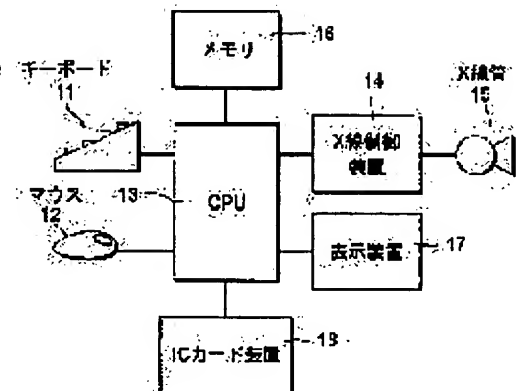
(72)Inventor : OKUMURA YOSHITAKA

## (54) X-RAY IMAGE DIAGNOSTIC DEVICE

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To easily perform a quantitative administration of an exposure X-ray amount for a subject by a method wherein a corresponding relationship between an input X-ray condition and an exposure X-ray amount by a generated X-ray, is stored, and the X-ray condition is converted into an exposure X-ray amount by accessing to the memory means, and the X-ray exposure amount is indicated.

**SOLUTION:** When an X-ray condition is input by operating a keyboard 11 which is connected to a CPU 13 and a mouse 12, a command is sent to an X-ray control device 14, and an X-ray tube 15 is controlled conforming to the condition. In the meantime, in a memory 16 which is connected to the CPU 13, a corresponding relationship between the X-ray condition and an exposure X-ray amount by an X-ray which is generated from the X-ray tube under that condition, is stored. Then, when the X-ray condition is input by the keyboard 11 and the mouse 12, an exposure X-ray amount corresponding with the X-ray condition is read from the memory 16, and an exposure X-ray amount which is converted by corresponding with the input X-ray condition, is indicated by a display device 17.



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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the X-ray picture diagnostic equipment which obtains the image information which is useful to irradiating an X-ray at the body and performing a medical diagnosis.

[0002]

[Description of the Prior Art] Conventionally, X photography equipment, fluoroscopic X-ray apparatus, an X-ray CT scanner, etc. are used as X-ray picture diagnostic equipment. Each of these obtains useful image information to a diagnosis medical about the body. X photography equipment copies radiolucent finding on a film etc., fluoroscopic X-ray apparatus acquires the video signal of radiolucent finding using an image intensifier and a TV camera, and this is displayed on TV monitoring device as a radioscopy image, or it photos it on a film. An X-ray CT scanner reconfigures a tomogram by collecting and computer-processing an X-ray transparent data.

[0003]

[Problem(s) to be Solved by the Invention] However, at X-ray picture diagnostic equipment, although image information useful to a medical diagnosis was obtained, on the other hand, the problem of the X-ray exposure to the body was produced, and, moreover, there was a problem that management about this X-ray exposure could not be performed easily, by the conventional X-ray picture diagnostic equipment.

[0004] Especially, an X-ray tube and an X-ray generator serve as high performance by technical progress, and since the equipment which can carry out the long duration exposure of the high X dosage has been increasing in number, the problem is large in recent years. There is also indication that on the other hand the diagnostic value expected by image information and the amount of X-ray exposures received in obtaining the image information should be measured and taken into consideration. Since exposure X dosage changes with each equipment also with the same X filament affair, if information about exposure X dosage is not shown for every equipment, the quantitative management about the exposure X dosage of the subject is impossible. Nevertheless, no conventional X-ray picture diagnostic equipment is equipped even with the function which displays exposure X dosage quantitatively.

[0005] This invention aims at offering the X-ray picture diagnostic equipment which has improved so that quantitative management of the exposure X dosage to the subject can be performed easily in view of the above.

[0006]

[Means for Solving the Problem] In the X-ray picture diagnostic equipment according to this invention in order to attain the above-mentioned purpose A means to input X filament affair, and an X-ray generating means to generate an X-ray according to X filament affair in which it was this inputted, It has been the description to have a storage means to memorize the correspondence relation between X filament affair and the exposure X dosage by the X-ray generated from an X-ray generating means, a conversion means to access this storage means and to change X filament affair into exposure X dosage, and a means to display the changed amount of X-ray exposures.

[0007] If X filament affair is inputted, it will be changed into the exposure X dosage corresponding to it, and the exposure X dosage will be displayed. Therefore, the display is seen, and exposure X dosage is got to know and it becomes possible to improve or correct X filament affair.

[0008]

[Embodiment of the Invention] Below, it explains at a detail, referring to a drawing about the gestalt of implementation of this invention. In drawing 1, the keyboard 11 and the mouse 12 are connected to CPU13, and X filament affair, an

acknowledge signal, a priority signal, exposure X dosage, etc. can be inputted now by operating these. If X filament affair is inputted fundamentally, a command will be issued by the X-ray control unit 14 according to it, and X-ray tube 15 will be controlled as the condition. That is, if X filament affairs, such as voltage of X-ray tube, the tube electric current, exposure time amount, and photography number of sheets (count of exposure), are inputted, X-ray tube 15 will drive with the X-ray control unit 14 by a voltage-current, time amount, and a count just like that, and an X-ray will be irradiated from X-ray tube 15. An exposure X-ray penetrates the subject which is not illustrated, incidence is carried out to a film (not shown) etc., and record of an X-ray picture is performed.

[0009] On the other hand, memory 16 is connected to this CPU13. This memory 16 has memorized the correspondence relation (table) between X filament affair and the exposure X dosage by the X-ray generated from X-ray tube 15 at the time of that condition. This correspondence relation is beforehand measured and written in for every equipment. And if X filament affair is inputted by a keyboard 11 and the mouse 12 as mentioned above, the exposure X dosage corresponding to the X filament affair will make a note, and it will be read from 16. When X filament affair can become with combination, such as voltage of X-ray tube, the tube electric current, exposure time amount, and a count of exposure, and exposure X dosage cannot be made to memorize about all these combination Exposure X dosage is made to memorize only about the typical combination, and when CPU13 performs interpolation count etc. from the value of the neighborhood of it, you may make it ask, when the exposure X dosage corresponding to X filament affair in which it was inputted is not memorized.

[0010] The exposure X dosage changed corresponding to X filament affair in which it was inputted is displayed with a display 17. Therefore, when an operator looks at the display in this display 17, it can judge whether exposure X dosage is suitable or excessive, and based on that decision, X filament affair can be improved or it can correct. When [ at which exposure X dosage is suitable ] it corrects at the time and considers as suitable X filament affair, a keyboard 11 or a mouse 12 is operated and an acknowledge signal is inputted into CPU13. Then, the command corresponding to the checked X filament affair is given to the X-ray control unit 14, and an X-ray is irradiated from X-ray tube 15 as the condition.

[0011] IC card equipment 18 is also connected to CPU13. The IC card with which the X-ray exposure hysteresis (the time and the exposed dose which were contaminated) of each one of subject was recorded is inserted in this IC card equipment 18, this record is read, and it is displayed in a display 17 with the exposure X dosage corresponding to the above-mentioned X filament affair. Then, in relation with the X-ray exposure hysteresis of the subject individual who is going to conduct X-ray inspection from now on, it becomes possible to make the above-mentioned judgment. When an acknowledge signal is inputted as mentioned above and X-ray exposure is actually performed, the exposure X dosage is recorded on an IC card with time.

[0012] Thus, since the hysteresis of the past in the X-ray exposure about the individual is known even if an operator, a medical practitioner, etc. change when undergoing X-ray inspection by the various clinical divisions in various hospitals etc. and same hospitals etc. by giving everybody the IC card which recorded the X-ray exposure hysteresis of each one of subject, a suitable judgment about an X-ray exposure of the individual can be made.

[0013] When X filament affair was inputted above, although it is changed and displayed on exposure X dosage, conversely, exposure X dosage can be inputted, and it can also be changed and displayed on X filament affair of corresponding. At this time, after inputting the priority signal which operates a keyboard 11 and a mouse 12 and shows exposure X dosage priority and switching the mode, exposure X dosage is inputted. When only one X filament affair when some X filament affairs are shown in a display 17, after choosing one of them is displayed and it is judged that it is suitable, an acknowledge signal is inputted immediately. Thereby, the command about the X filament affair is given to the X-ray control unit 14, and the X-ray as the condition is irradiated from X-ray tube 15.

[0014] If the IC card of that subject is inserted in IC card equipment 18 also in this case and X-ray exposure hysteresis is read, that hysteresis will be displayed with the display 17. Since exposure X dosage can refer to it decision and an input, the medical practitioner and the operator are convenient.

[0015] When returning to the mode of previous X filament affair priority, the priority signal which shows X filament affair priority is inputted with a keyboard 11 and a mouse 12.

[0016] When forming for which part it follows, for example, the tomogram for the slice cut surface of how many sheets is picturized in the slice pitch like which in an X-ray CT scanner, and a diagnostic plan, according to exposure X dosage, this plan can be formed or it can correct, and it becomes possible to perform the diagnosis which considered the safety about the X-ray exposure of the subject. Moreover, it is possible to constitute from fluoroscopy by fluoroscopic X-ray

apparatus so that CPU13 may judge it automatically, may take out a halt command to the X-ray control unit 14 and may stop subsequent X-ray exposure, when long time amount fluoroscopy is performed and it comes to exceed the inputted exposure X dosage etc.

[0017] In addition, although it constitutes above so that a keyboard 11 and a mouse 12 may perform various inputs, a configuration switch, a transfer switch, etc. of dedication may be used. Moreover, what was constituted as a control unit of dedication, without using CPU13 can also be used. in addition, it is the range which does not deviate from the meaning of this invention, and, of course, various concrete configurations etc. can be boiled and changed

[0018]

[Effect of the Invention] Since the exposure X dosage corresponding to X filament affair is changed and displayed according to the X-ray picture diagnostic equipment of this invention as explained above, quantitative management of the exposure X dosage to the subject can be performed, and the safety about the X-ray exposure of the subject can be raised more.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The block diagram showing the gestalt of implementation of this invention.

[Description of Notations]

11 Keyboard

12 Mouse

13 CPU

14 X-ray Control Unit

15 X-ray Tube

16 Memory

17 Display

18 IC Card Equipment

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CLAIMS

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[Claim(s)]

[Claim 1] A means to input X filament affair, and an X-ray generating means to generate an X-ray according to X filament affair in which it was this inputted, X-ray picture diagnostic equipment characterized by to have a storage means to memorize the correspondence relation between X filament affair and the exposure X dosage by the X-ray generated from an X-ray generating means, a conversion means to access this storage means and to change X filament affair into exposure X dosage, and a means display the changed amount of X-ray exposures.

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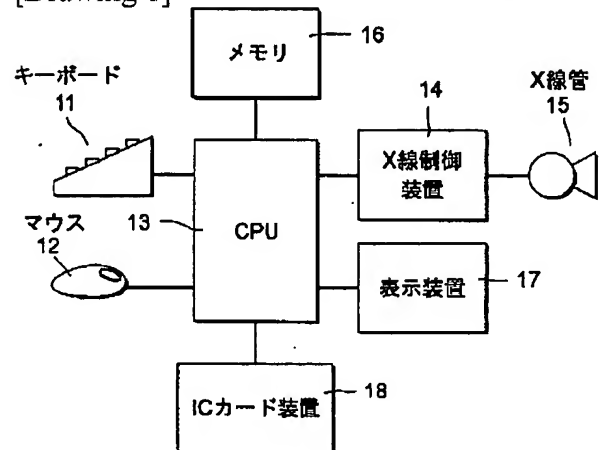
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DRAWINGS

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[Drawing 1]



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